

IN THE CLAIMS

We claim:

1. A hydrogen permeation membrane comprising a niobium alloy with 5-25 wt.% of at least one element from the group consisting of palladium, ruthenium, rhenium, platinum, gold, and rhodium.
2. A hydrogen permeation membrane according to Claim 1, and further comprising at least one of zirconium and hafnium.
3. A hydrogen permeation membrane according to Claim 1, wherein the alloy has 0.5-3.0 wt.% of zirconium and 10-20 wt.% of palladium.
4. A process for producing a hydrogen permeation membrane, comprising the steps of:
applying at least one coating of at least one element from the group consisting of palladium, ruthenium, rhenium, platinum, gold, rhodium, zirconium, and hafnium on a substrate of one of niobium and a niobium alloy with at least one element from the group consisting of palladium, ruthenium, rhenium, platinum, gold, and rhodium to form a composite; and
subjecting the composite to a diffusion heat treatment.
5. A process according to Claim 4, including applying the coating one of by the PVD process, by chemical deposition, by electrodeposition, and by mechanical plating.

6. A fuel cell comprising a hydrogen permeation membrane consisting of niobium alloy with 5-25 wt.% of at least one element from the group consisting of palladium, ruthenium, rhenium, platinum, gold, and rhodium.

7. A hydrogen permeation membrane for a fuel cell, produced by:

applying at least one coating of at least one element from the group consisting of palladium, ruthenium, rhenium, platinum, gold, rhodium, zirconium, and hafnium on a substrate of one of niobium and a niobium alloy with at least one element from the group consisting of palladium, ruthenium, rhenium, platinum, gold, and rhodium to form a composite; and

subjecting the composite to a diffusion heat treatment.